Notebook Series -- Notebooks by Edison
Notebook, N-19-04-23.2

This notebook was used during April-May 1919 and May 1920. The entries from 1919 are by Benjamin F. Sorin and pertain to his construction of pressed chalk cylinders and "buttons" for Edison's experiments. Each entry describes the composition and construction of a batch of cylinders, sometimes indicating when Ludwig F. (Louis) Ott or other laboratory employees supplied chemicals or materials and occasionally noting when the results were shown to Edison. The entries from 1920 are all by Edison and indicate that he "just returned to expmtg with chalk phone." The notes relate to experiments with electromotograph (chalk) telephones using different chalks in various circuits. Included are descriptions of experiments with manganese oxide chalks, some of them faced with various metallic washers, made with varying amounts of pressure. The entries indicate that Frederick P. Ott assisted Edison in some cases. Inserted into the book are notes by Edison, Sorin, and William W. Dinwiddie. The front cover is marked "Note Book." The book contains 100 numbered pages; pages 54-100 are blank.

Pressed chalk Cylinders.

Benjamin F Loun.

april - 23 - 1919.

81082
Acme Co.,
MFG. STATIONERS,
95 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

Cabinet # 5. April-23-1919.

Pressed chalk cylinders.

Shelf # 1

Made 25 chalk cylinders for Mr J.A.E. by taking 5.8 grams of chalk and mixing with 4 drops of water, mixing well to distribute the moisture then putting in mould & pressing in hydraulic press up to (300 atoms) or 1650 on high reading gauge. Of course 1622 is the accurate figure for pressing but we couldn't get that reading on the gauge because it isn't graduated so fine so I took the nearest figure which is 1650.

Shelf # 2 Apr-24-1919

Made 25 cylinders of strontium Carbonate without using water 7/16" long. by taking 7.8 grams of strontium Carbonate and putting in die and pressing up to 1600 1625 on high reading gauge which make approximatly 360 atmospheres of pressure used.

Shelf #3 April-25-1919

Alumina Hydroxide.

Made 8 cylinders of alumina Hydroxide 7/16" Long by using 2.8 grams of alumina Hydrate and 500 lbs pressure on Large gauge. as per instruction of T.A.Edison.

Made 8 more cylinders of alumina Hydroxide by instruction of T.A.E. 13/32" Long by using 3.8 grams of alumina Hydroxide with 1000 lbs pressure on high reading gauge.

Tried to make 8 cylinders more for T.A.E. 13/32" Long by using 4.2 grams of Alumina Hydrate with 1500 lbs of pressure on high gauge with moisture & without but didnt succeed very well as they the buttons all cracked or chipped so you couldnt use them, showed most of them to Mr T.A.E. and he advised not to try and make any more.

Tryed it again & finally succeeded by using 4.2 gram alumina Hydrate with 8 drops of water 1500 lbs pressure & got a fairly good button

May-22-1918. made 5 buttons.

Shelf #4. april-29-1919

Light Calcined Magnesia

7/16" Long

Made 4 at 300 lbs pressure using 3.6 grams calcined magnesia without water

4 at 600 lbs using 4.3 grams calcined (mg) magnesia without water.

4 at 800 lbs using 4.8 grams Calcined Magnesia without water.

4 at 1200 lbs using 5.2 grams calcined Magnesia and using 4 drops of water.

4 at 1600 lbs using 5.5 grams calcined magnesia using 4 drops of water

5 at 2500 lbs using 5.8 grams of calcined magnesia using 5 drops of water.

Shelf 5 May 1st/11

Zinc Oxalate.

Made 8 cylinders of Zinc Oxalate by using 5.5 grams with 800 lbs pressure getting a button 7/16" long.

Made 8 more cylinders of Zinc oxalate by using 6.2 grams of with 1600 lbs pressure getting a button 7/16" long.

Made 9 more cylinders of Zinc oxalate by using 6.5 grams with 2500 lbs pressure getting a button 7/16" Long.

The buttons wouldn't stick very well so I used water as a binder as follows 5.5 grams 4 drops 6.2 grams 5 drops, 6.5 grams 6 drops after which I got a fairly good button.

The Zinc oxalate is the precipitate that was made by Louis Ott.

Shelf 6 May 5th.

Calcium Oxalate.

Made 5 cylinders of Calcium Oxalate by using 4. grams of Calcium Oxalate and 6 drops of water with 800 lbs pressure of which I got a fairly good button 7/16" long.

Made 5 cylinders of Calcium Oxalate of using 4.5 grams Calcium Oxalate and 6 drops of water with 1600 lbs pressure by which I got a pretty good button 7/16" long.

Made 5 more ~~of~~ cylinders of above by using 5.5 grams of Calcium Oxalate & 6 drops of water with 2500 lbs pressure by which I got a 7/16" button which chipped very easily.

The calcium Oxalate was made by L. Ott

Shelf #7 May 8th

Colaltus Oxalate.

Pressed 8 buttons of Cobaltus Oxalate 7/16" long by using 4.5 grams Cobaltus Oxalate with 800 lbs pressure without water.

8 more 7/16" long - 5.7 grams 1600 lbs pressure without water.

9 more 7/16" long using 5.8 grams with 2500 pressure without water.

Cobaltus Oxalate made by Lott.

Shelf 8# May 9th.

Manganese Oxalate.

Made 7 button of manganese Oxalate by using 4.8 grams with 4 drops of water at 800 lbs pressure 7/16"

2 buttons of Manganese oxalate by using 5.4 grams with 5 drops of water at 1600 lbs pressure 7/16"

2 buttons of manganese oxalate using 5.8 Grams with 6 drops of water at 2500 lbs pressure 7/16"

These were very hard to make as the chipped very easly and especially the (5.8 - 2500) buttons they chipped in their own accords.

Manganese Oxalate was made by Louis Ott.

Shelf 8# May 10th

Stannous Oxalate.

Made 2 buttons Stannous Oxalate by taking 8 grams of Salt without water and pressing up to 800 lbs pressure getting a 7/16" button

2 buttons taking 9 grams stannous oxalate without water and pressing up to 1600 lbs pressure getting 7/16" button.

2 buttons taking 10 grams stannous oxalate without water & pressing up to 2500 lbs pressure getting 7/16" button.

Stannous Oxalate was made by Louis Ott.

Shelf #8 May 13th

Copper Oxalate (Cuprus).

Made 2 buttons by using 5.8 grams Copper Oxalate with 1cc water at 800 lbs pressure getting a 7/16" button.

Made 2 more by using 6.6 grams Copper Oxalate with 1+cc water at 1600 lbs pressure getting a 7/16" button.

Made 2 more by using 6.8 grams Copper Oxalate with 1+cc water at 2500 lbs pressure getting a 7/16" button.

Had a pretty hard time making these to get them approx right as they broke - split or chipped very easily and had to proportion moisture until it held together

Copper Oxalate made by LOU.

Shelf #9 May 15th

Strontium Oxalate

Made 6 Buttons of strontium Oxalate by take 5.8 grams with out water at 800 lbs get a 7/16 in. button

Made 6 more of strontium Oxalate by using 5.8 grams without water at 1600 lbs pressure getting 7/16" button

Made 6 more of strontium Oxalate by using 6.2 grams with out water at 2500 lbs getting a 7/16th button

Strontium oxalate made by Louis Ott.

Shelf #10 May 19 1919.

Chalk Cylinders

As by request of Mr Edison I made as follows. 6 sets of 4 each of Chalk with 1500 lbs pressure, but each set having more water so that the last set is to wet to mold.

Used 5.8 grams of chalk with 1500 lbs pressure in ea but the water as a binder varies in ea set as follows

4 cylinders	5.8 grams	1500 lbs pressure	5 drops
4 "	5.8 "	" " "	10 "
4 "	5.8 "	" " "	15 "
4 "	5.8 "	" " "	20 "
4 "	5.8 "	" " "	25 "
5 "	5.8 "	" " "	30 "

After I came to 30 drops I showed product to Mr Edison and he said that was enough water ~~for~~ that. chalk came from Hoffman Dec Blank.

Shelf 11 May 28 1919.

Alumina Hydrate.

(a) As per request of Mr Edison I made 2 ea of Alumina Hydrate using 4.2 grams of Alumina Hydrate at 1500 lbs pressure but adding more water to ea set so that last set is too wet to mould.

Used in ea 4.2 grams with 1500 lbs pressure but water in ea set varies as follows.

				Water
2 cylinders	4.2 grams	1500 lbs pressure		8 drops
2 "	4.2 "	1500 "	"	12 " "
2 "	4.2 "	1500 "	"	16 " "
2 "	4.2 "	1500 "	"	20 " "
2 "	4.2 "	1500 "	"	25 " "
2 "	4.2 "	1500 "	"	30 " "

after I used 30 drops I showed product to Mr Edison he said that it was wet enough.

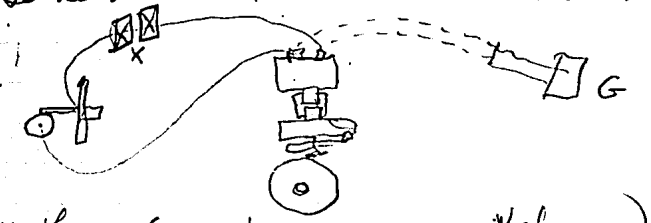
Alumina Hydrate came from Denvedda

May 13 1920

Just returned to Expmtg with Chalk phone –

Using Light Calcined Magnesia
750 lbs on our present gauge
Small single hydraulic press
15" ram in Lab – (Chem)

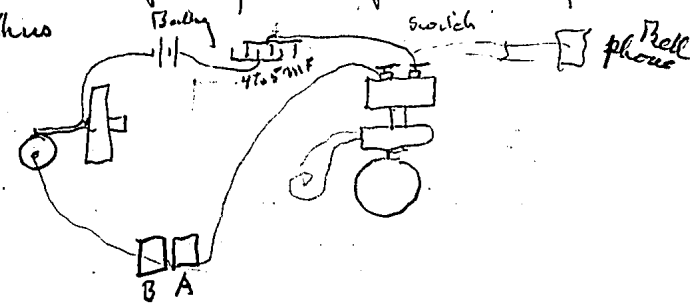
Used high res head phone. Amberal
Band record. 1100 ohm



X the 2 boxes for measuring Vol used by WE Elec made by Thompson Lebroung & Co

Edison Couldnt hear Bell phone G or the Chalk phone –

then thinking the current from the Chalk itself might interfere arranged it thus



With this arrangement I hear it loud but do not get it when A arm is advanced 1 point.

I cannot hear anything on Bell phone —

If I reverse Battery I get nothing so an impressed Voltage without Current is GREAT IMPROVEMENT in sensitiveness One of largest advances made recently

I note that beyond a certain number of Cells of Battery it does not improve Volume

I used 7 cells E D Battery ~150 V 10 V Reversible
hence we must have 25 Leclanche
with Controller to cut in + out
one cell at a time –

I wet a Magnesia Chalk + kept
it working 1/2 a day by covering
it with wet cloth while not
using – also left it all night
15 hours Cloth was damp in
morning but still could hear
music slightly – probably
Carbonation hurt it –
This shows that in closed
space with damp cloth etc +
no CO_2 it will last at least
24 hours without any loss
of Volume –

I now put in a newly made light
Calcined Magnesia at 750 on Gauge
This was moulded Dry – no water
used. It's an improvement over
those made damp – porosity more
takes 21% KOH better + quick soon
dries then track is good without

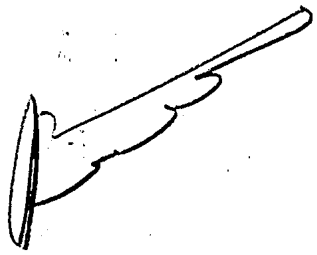
Tearing = This is another great improvement as we can now make the Mg Cylinders which has constant physical properties —

Another is that the Loudness is much improved as I now hear it on No 2 of 60x Zero or 60x out being No 1 —
Using 8 Cells + 3 Condensers —

Tried 9 10 + 11 Cells but dont notice any improvement.

I notice its considerably louder when Mg Cylinder is reversed as to turning — This shows there is still chance for improvement in the Diaphram + pressure devices or Palladium —

All night found it weak, not clear in morning New No Wet Mg — also found it translucent LOEF it agrees with only little KOH. we could not account but in hour it was



as good as last night
as I was abandoning the
Mg I press a finger on
surface for 2 Rec - lost all
sound - Observing
[illegible] bad -

New 750 Mg O - Black pole of bat
to N of chalk phone Mg OK

I found that I call doubles sound
+ after that not much increase
up to 24 - 8 seems best + about
20 @ 25% increase volume over
-1 or 24 Calls - fine adjustment
to vary fraction of a volt
I found no place where it
balanced abandoned it
(12) fine adjustment altho it
may be OK finally to use it

I notice 2nd dry MgO when it wet it softened up must rig up to left pressure until dry then let it down - if all pressure off it dont touch as OK

Our Bell Sending phone is 1100 ohm

Cant say what receiving phone is but put one in marked 1500 ohms & it wasnt as loud —

Our MgO Cylinder & perhaps all our cylinder have more Resistance than I suppose

A Voltmeter giving 1.4 V when chalk put in was almost Zero, still on turning, latter gives shade more deflection

left MgO all night wet cloth (very wet)
1/2 strength in morning - wet with
water + let it dry without pressure
on - got 3/4 of full strength
again with more water
of an excess took several minutes
to dry = came full strength.

Phenomenon

MgO 500 lbs pressure
instead of 750 lbs of the other
3 MgO used —
This 750 lb without Box gives say
100% load - barely hear to #2
with MgO 500 lbs pressure get
without Box 80% + hear to
#8 - 5 5 !

The only Explanation of this is that the Resistance of 500 Ω across MgΔ is much less than 750 + I can go to #8 but this dont Explain why it is less loud on Zero box

But I call in — the Voltmeter I tested the others gave about same deflection 1/4 of 1 deg Turning on not makes little difference Condensers out — Dont seems to have less Res perhaps 10 % less — So sensitiveness must have been actually increased by more open pores when box Res was increased

After standing MgΔ 500 got considerably louder on Zero but I couldnt hear response #8 —

Fred Oth. ~~tried it~~ got 24 on Box
+ only 12 on Bell –
This is MgO 500 lb

MgO 100 – not so loud as 500
on Zero, about same as MgO 750
Can hear to #2 on Box –
showing great superiority
of 500 lb where I go to #8

Dep MgO 500 – at Dupso OK

New Idea – Think less pressure
makes a MgO softer + when
Palladium presses hard it
compresses it when must
lower at track

↓ This makes whole touch
↓ covers Fes whereas hard
Cylinder only points touch

hence hard cylinders NG
only cylinders good that
forms a depression band for
Palladium & gets it all in
contact & polishes —
500 lbs does this — a
400 wouldn't impress it
probably

Tried 2nd 400 lb on depression
of track theory —
OK — wet it & moment all
moisture disappeared put
pressure on platinum gradually
& within 2 mins or less
increased pressure beyond
what we need till get polished
full sized depression then —
diminished press to Reg
amount approx & it
was OK Hard to 8
on boy —

Think 500 to 400 best
favoring 400 lbs

Well test 300 + 200 morning

Tried 300 lb MgO – It makes a depression track more easy than 400 – takes very much more RAM than 500 lbs, but no matter how I work it it not near as loud as 500 lbs –
+ 200 lb MgO is ~~coarse~~ earthed
ou ro 2 of 6 ox 200 lb or 300 lbs

500 lbs makes a good depression track + as it is the loudest
near to 8 on 6 ox + 200 V lbs
I will adopt that as a standard –

750 lbs does not make any depression track is pretty + distorts the Volume of the Tuning it is not so good + is not quite as loud as 500

Standard MgO
May 17 1920

MgO - Light Calcined Moulded under 500 lbs on gr. wafer on 10" Ram - is not standard

Egerton says 6 Notches on box Cuts current To 1/2 —
That each notch is 1 mile —
Shows mile is 45 ohms with a Condenser across hearing .054 Microfarads $\frac{1}{20}$ IK MF

Several Experiments shows 500 lbs pressure on MgO is best Takes 3 Red Rubber full of zi/KEA with good big pressure just after working & dried all absorbed gives a slight sunken Track which is nicely polished & reflects light like glass & is very good & satisfactory Hear to #8 on Box the calculated Limit — Cant hear Bell Phone at Zero Box —

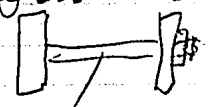
Phenomenon

Removing the 5 Cells from Cement makes Mg scarcely audible on Zero box

While battery is in cement Reversing the poles makes big difference -

Palladium pen louder than platina pen thick twice as loud -

It may be the Voltage between Palladium & platina has something to do with it I am now putting then Washers of different Metals on ends of the mandrel against which the Mgo Rests - I must insulate this



so only the special metal I want touches the Mgo

Platinum Point

Silver #2 on box – (5 cells)
Mandrill not yet insulated –

Nickel #2 on box

Zinc #1 on box & very weak

Lead # get #8 taint #6 is about sure limit – secondarily is its weak on Zero –
Any way this shows that Platinum could be used on point instead of Palladium but weaker –

Tin # get 8 on box sure –
Cant get # 10 = quite weak on Zero – not so much as lead –

Aluminum – can go to # 4
Weak start – when battery cut out nothing but wait several seconds comes up, battery cut in nothing – several seconds cant & on OK again –

Platinum —

Copper - # 8 good extraordinarily 10 = This is best yet Cut I think I got it by wetting MgO much more than any of the other metals - in addition I found ~~in all~~ the Rubber had stuck to pan - This might have done something with it — Zero is weak also will big wetting after iodide gets weak —

Run the Copper down it may have right Eff + ev to content + absorbs Q may be just what's needed —

Reg MgO, with Copper washers insulated with Rubber tube from Mandrel so Chalk only touches Copper — Palladium pan

Remark of Possibly a point

By putting Palladium back & using Copper Washers - I get #12 on box sure & think I hear 14 -
Its loud on Zero & clear - & doesnt suddenly drop so much on going to No 2 on box =
Reversing poles on Elec. itself very little change -

Apparently it needs both poles to be non polarizible - Oxidizes on Mandrel & it absorbs on pen

500K Mgo
Oxidized part of Copper Oxidized - where touch chalk but small area touching chalk cleaned of Oxide - Using Platinum point get #10 on box & think I hear to #12 -

Oxidized Copper washers - same one that were used in above new 500K Mgo & Platinum pen tried but only 80 - I notice track one sided, put in New Mgo - I notice blackening of the Cu against the platinum of mandrel

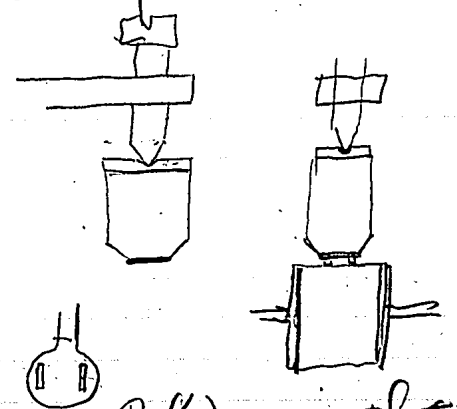
#6

Possibly it need. Metallic Copper washers to absorb Oxygen - possibly amalgamated

#7

This should not be - something wrong

Will make a change



Palladium ~~[illegible]~~
Metallic Copper on side Mag.

This goes to $8 on Gas. dont seem to be nearly as long perhaps MgO varies - 1st lot Sample made were more densely - 500 lbs 005 Mica
1/8 aluminum dome - Plumbed

I reversed the poles at Emq it
Came loud – then went low
put them back reg way
Came louder got #10 on
box –

This pen will work up to #8
with very slight pressure on pen
This pressure adjusting Change
is an improvement

Think Mgo should be 1/8 longer
at Palladium points only 1/16
from Edge

There is a lot to the battery 5 Cells
it acts strange – should
investigate at it at times
More than doubles loudness

After working & forming track
the loudness improves by
standing 1/2 hour – at least
it appears to.

Phenomenon

By putting in 7 ESBat Co Cells in Circuit

By putting in a condenser in circuit with MgO - weakens it very much -

By shunting MgO with Polarized Relay of Quad it strengthens it Enormously

I get # 20 on 60 X

WhEW -

Condenser 5 Mf in line

May 28/1920

Have tried all kinds of Magnets + Bunnel Coils Core in & Core out.
Best is old polarized relay 1st used
Next is secondary of a Bunnel Coil
Core varied only secondary used
Secondary Marks 1359 – 9350 T.

Never went higher than 18 on box
1st Expert got 20.
But several times on best magnets
only got 12 on box — once got
12 without any Magnet
This shows high sensitiveness
still due to accidental
Conditions of the MgO + wetting
Etc, But the very high sensitiveness
is due to Magnet Oriented
across the MgO —

[ITEMS(S) FOUND IN BOOK]

8 with 500 lbs
8 with 1000 lbs
8 with 1500 lbs

Mark each on end &
Put them in order in
holder —

Alumina
Hydrate
Apr-24-1919

[ITEMS(S) FOUND IN BOOK]

Ligia Cadena
Magnacia —

[ITEMS(S) FOUND IN BOOK]

Make 24 Chalk
6 Sets, of 4 Each with
1500 lbs - but each set having
more water so that last
set is too wet to mould

Do the same with
Aluminum Hydroxide
24 —

Completed
5/25/19
RD

[ITEMS(S) FOUND IN BOOK]

Cabinet Mapuera

4 at 300 Lbs
4 " 600 "
4 at 800 "
4 at 1200 "
4 at 1600 "
4 at 2500 "

[ITEMS(S) FOUND IN BOOK]

Imperial Color wks.
Glenn Falls
N.Y.

Imperial Color Wks.
47 SE 34th St.
N.Y. City.
Greeley 268.